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AUTHOR Beltran, M. Beatriz; de Juarez, Cheryl Lani H.
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ABSTRACT

The Computer Assisted Spanish English Transition Sequence (CASETS) Project used a developmental research approach to design and adapt curriculum materials for computers; the approach involved a continuous process of materials design, classroom implementation, evaluation, and modification. During the first year of the project, sets of 26 lessons each were designed for first and second levels of English as a Second Language (ESL) classes and seventh and eighth grade social studies and life skills classes. Materials were written in BASIC programming language for use with a TRS-80 II computer and video screen. First-year evaluation results, based on data collected through site visits, interviews, and project office records, indicate that CASETS was successfully implemented as proposed during the 1980-81 school year. The desired English language proficiency criterion was achieved, and surveys of parents, students, and teachers indicated a strong positive attitude toward the project and computer assisted instruction (CAI). Additional capabilities of the project were planned for implementation during the 1982-83 school year. The project includes a training component for educators and administrators and for CASETS project staff. A glossary of CAI-related terms is attached. (LMM)

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COMPUTER-ASSISTED SPANISH ENGLISH TRANSITION SEQUENCE: A DEVELOPMENTAL RESEARCH APPROACH FOR THE IMPLEMENTATION OF EDUCATIONAL SOFTWARE

by

M.Beatriz Beltran

and

Cheryl Lani H. de Juarez

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COMPUTER-ASSISTED SPANISH ENGLISH TRANSITION SEQUENCE:
A DEVELOPMENTAL RESEARCH APPROACH FOR THE IMPLEMENTATION OF EDUCATIONAL SOFTWARE

One of the most frequent criticisms of curriculum development projects is that the materials are designed and produced between four walls without ever getting to be pilot tested or field tested.

In the field of computers in education the story is not different:

> "In spite of the level of funded development projects over the last 10 years, a lack of documentation, validation and dissemination has resulted in an apparent paucity of adequate materials for use in either administrative or instructional computing." (MicroSIFT, 1980)

Kean and McNamara (1978) argued that "compensatory programs", for instance, "should be conceived as possible solutions to problems, rather than as projects to be completed and then judged as successes or failures on an all or nothing basis."

> "A major issue and possible solution or solutions to it should be announced with the intention of development taking place. Development refers to growth, not just final packaging of a fixed idea and includes the process of initiation, implementation, observation, modification, and recycling. Through gradual refinements over a period of time, a truly useful educational approach can be introduced that may be a far cry from the starting point which catalyzed the entire chain of events." (Kean and McNamara, 1978)

The Computer-Assisted Spanish English Transition Sequence Project did not make any commitment in its initial proposal as far as the methodology to follow in adapting/developing the curriculum materials for computers. After a close, but rather fast, look into the school situation, a developmental research approach was employed in order to avoid the risk of becoming obsolete at the completion of the three years funded by the grant.

IMPLEMENTATION

Using Program Evaluation and Review Techniques (PERT) Network, CASETS staff reviewed curricula and textbooks, selected, designed, wrote, recorded, classified, developed, translated, edited, and programmed the first set of evaluation instruments to be used in the schools. Then the pre-assessments were administered, and materials were implemented for two weeks. After analyzing the materials with students and teachers, a second

set of materials was prepared and again tested in school. The process continued during the semester. During the summer, seventh grade social studies and ESL curriculum writers (teachers who were implementing the baseline materials during the school year) developed the remaining written materials.

The materials currently being design tested in two public middle schools and one private middle school are the results of numerous refinements according to the "implementation, observation, modification and recycling of developmental research."

Computer programs in current use also have been modified. First, they were developed in PILOT; but then, because of memory storage space problems, BASIC was adopted. At present, the lesson programs are developed on a principle of mass production. One main program (shell) is merged with one data file (shell) which contains the concepts and exercises specific to that lesson.

The CASETS staff is proving what Donald Sanders said in March, 1981:

> "...developmental research could provide a mechanism for intelligent human participation in design of educational forms compatible with the reality of social evolution." (Sanders,1981)

CASETS has contributed to technological evolution as well.

ENGLISH-AS-A-SECOND-LANGUAGE (ESL) MATERIALS

CASETS has employed a cognitive approach to language development. CASETS ESL materials are correlated with a baseline of social studies (American History) curriculum objectives. These objectives are to be met through regular social studies classroom instruction and are reinforced during subsequent Spanish/English bilingual social studies computer-assisted instruction (CAI) sessions. These historical concepts include such general topics as Map Skills, Early Inhabitants, Exploration and Discovery, Revolution, and Early National Development.

Regular ESL classroom instruction of writing and reading skills is reinforced within the meaningful context of these historical time frames. These skills are developed in two sets of ESL lessons (26 lessons per set). There are four 10 minute CAI sessions per ESL lesson.

WRITING SKILLS & READING SKILLS

Writing skills reinforced in these lessons include spelling, punctuation, correct English usage (i.e., parts of speech, verb tenses), and sentence recognition/classification.

To develop reading skills, students must identify main ideas, solve sequence problems (alphabetical, time, quality, syntax), perceive cause

and effect, evaluate information, distinguish fact/non-fact, predict outcomes, draw conclusions, use reference skills, and expand vocabulary (semantics).

ESL instruction is reinforced at two levels of difficulty. In Level I ESL materials, students experience language patterns, tenses, and basic parts of speech through a non-prescriptive, simplified, short-story approach. Level II ESL instruction provides a more structured, yet simple approach to the development of reading and writing skills. At this level, more complex sentence structures and language patterns are introduced and further developed.

At both levels of ESL instruction, the target students' low reading level and limited English proficiency are accommodated through the use of simple language and great editorial attention to the detail of the text display. Concepts are presented through a maximum of six (6) consecutive frames (CRT displays), averaging 25-35 words per frame. Concepts are then further reinforced by a 12-question drill and practice session comprised of 6 question formats: Completion, Multiple Choice, True/False, Sequence, Matching and Analogy.

SOCIAL STUDIES MATERIALS

CASETS' social studies materials are designed to reinforce the regular classroom instruction of basic social studies concepts. These concepts are coordinated through a social studies baseline of instruction. The concepts include these areas: Map Skills, Geography, Early Inhabitants, Exploration and Discovery, Colonial America, Revolution, Formation of the Constitution, Citizenship (Rights & Responsibilities) Early National Development (Expansion), Changing Ways of American Life (Industrial Revolution, Transportation, Reform), the Civil War, and Reconstruction.

Eighth grade social studies CAI materials focus on concepts of American History. The content of seventh grade social studies CAI materials dealsmore specifically with state (Texas) history.

A group approach is used in the presentation of information so that a group of 2-4 students can participate in each CAI session. Concepts are presented using a bilingual (Spanish/English) screen display. Each social studies CAI session consists of 4 bilingual concept frames and 12 bilingual question frames.

Each concept frame contains one or two social studies concepts presented in simple Spanish language (geared to dialects of the Southwest). This Spanish language instruction is followed by an equally simple English translation. Each concept frame is immediately followed by a short drill and practice session (1-4 questions). These questions focus on the information presented in previous concept frames. The 12 drill and practice questions include these formats: Completion, True/False, Matching, and Multiple Choice.

LIFE SKILLS MATERIALS

Project CASETS' Life Skills materials are used in both the ESL and Social Studies classrooms. There are 26 lessons consisting of one 1 CAI session each. The lessons include these topics of instruction: how to read a map; reference skills; using a telephone book; filling out forms; getting a certified copy of your birth certificate; getting a Social Security number personal hygiene; beliefs; rules; responsibilities; voter registration; making good decisions; how to get a driver's license, health license, marriage license, or work permit; how to use a mail order catalogue; good eating habits, consumer skills (advertising & shopping); how to use the want ads; where to find a job; and how to apply for a job.

Life skills CAI sessions are augmented by the use of Life Skills activity cards. These cards provide for simple paper and pencil activities designed to involve the students in practical, hands-on experiences for the acquisition and development of these important and basic life skills.

SEQUENCE FOR CASETS INTERNAL QUALITY CONTROL

Through trial and error a sequence was established in order to ensure the quality of the materials before reaching the classroom.

At step 1, the curriculum writer develops lesson and puts the text on grid paper to indicate sequence and text location for the programmer.

At step 2, lesson is edited for content, spelling, grammar, and each frame's proposed text display.

At step 3, text and graphics are programmed according to author's/editor's specifications. A back-up copy of diskette is made.

At step 4, lesson on diskette is checked for obvious programming errors.

At step 5, corrections are made either by editor or programmer, depending on nature of problem.

At step 6, lesson on diskette is edited again for content and text display.

At step 7, a final check is made to insure that lesson is ready for dissemination to classrooms.

SOFTWARE

Programs and courseware developed by the CASETS project have been designed primarily for use with the TRS-80 Model I. This particular model provides good flexibility for the classroom when used with the approach CASETS has taken.

BASIC is used as the program language because of the particular computer chosen. It also lends itself well to computer-assisted instruction (CAI). BASIC was selected rather than PILOT, another CAI language, since it provides an increase in storage space for the program and creation of data files to keep records of students who work at the computer.

The program limits student input to certain variables to eliminate any errors which might be created by the student. Students are assigned to groups of four or less. A group name is given to distinguish between file names and to avoid duplication. Group names are limited to seven characters, as the computer truncates file names greater than eight characters. The number one is added to each file name to distinguish between program and data files. Input of students' names is also limited to a specified length of characters. Further restrictions limit the input to either alpha or numeric characters based on the question prompted.

Twelve questions have been programmed into each program. The number of questions each student receives is determined by the number of students in the group (12 questions/number of students).

Symbols appearing in the lower right corner of the screen may indicate when to press "enter" for additional information, when to press "enter" for the next frame of information, or when to wait for delayed information to appear.

The break key has been disabled to prevent students from tampering with the program. This addition prevents students from playing with the computer.

The development of the final program is based on the merging of a standardized program shell and data files. The use of the shell makes the production of each lesson faster and decreases the possibility of program errors. A standardized data file is used to input the information which varies from lesson to lesson. A rigid process of quality control is maintained to ensure that only materials of the highest quality are produced for classroom use.

HARDWARE

The hardware required for using the CASETS ESL and social studies materials is basically a TRS-80 Model I with only one enhancement. The enhancement added to the CPU is a Motorola chip which provides CRT display of the characters particular to the Spanish language. These include the accents on each vowel, the upside-down exclamation point and question mark, the umlaut symbol and the tilde symbol over the "n". The unit presently used in the classroom consists of a video screen (CRT), a keyboard with 16K, an expansion interface to add an additional 16K, one 1160 mini-disk drive and a line filter. An optional printer can be used to obtain hardcopy reports of students' activities for ongoing assessment.

CLASSROOM ACTIVITIES & MATERIALS CORRELATION

SOCIAL STUDIES		BASIC LIFE SKILLS CAI & ACTIVITY PACKETS	ENGLISH AS A SECOND LANGUAGE		
TEACHER INSTRUCTION	CAI LESSONS		LEVEL I CAI	LEVEL II CAI	TEACHER INSTRUCTION
U.S. geography map skills	DAY 1 north/south pole cardinal/ intermediate points compass rose	TITLE: "Where Are You? Where Am I?"	DAY 1 this/that is Is this...? yes, it is	DAY 1 directions compass rose	simple present "to be"
	DAY 2 maps: definition legend scale	INFORMATION compass rose legend scale	DAY 2 My name is... Let's + infinitive this/that	DAY 2 reading a map (key, scale) kinds of maps (atlas)	
			DAY 3 This/these singular/plural that/those	DAY 3 how to give simple directions	simple question/ answer
			DAY 4 this is close that is far these/those are	DAY 4 oceans/ continents review	

FIRST-YEAR RESULTS (1980-1981)

Data collected by the evaluator through site visits, interviews, and inspection of records at the project office indicated that the CASETS project was successfully implemented as proposed during the 1980-81 school year. There were 146 students served by the CASETS project during the 1980-81 school year in two schools: St. Mary of Carmel (Diocese of Dallas) and T.C. Marsh (DISD). It was projected that an additional 370 students would be served during the 1981-82 school year.

Curriculum development efforts exceeded the proposed scope for the 1980-81 project year. There are 26 Level I ESL lessons, 26 Level II ESL lessons, 26 lessons of both seventh and eighth grade Social Studies, and 26 lessons in the Life Skills curricula that have been written and/or are in various stages of completion (editing, programming, design-testing, or revision).

During the project year, the staff was required to select and/or develop standardized instruments to assess the English-language proficiency and the achievement of project students. Because of their district-wide usage, two instruments were chosen: the Language Assessment Scales II (LAS II), and the Iowa Tests of Basic Skills (ITBS) vocabulary and language sections of the Reading Subtest.

Parents, students and teachers were surveyed during the project year. Results of the surveys indicated a strong positive attitude toward the CASETS project and CAI. Initial implementation problems were overcome; both teachers and students felt comfortable using the curriculum presented through CAI and life skills modules.

Achievement data on project students were collected in the spring of 1981. All LEP students who were pre- and posttested using the LAS II achieved the English language proficiency criterion as stated in the proposal. A comparison of the ITBS subtest scores revealed that the LEP students gained one year and three months on the vocabulary section, and nine months on the language section, compared to nine months on both vocabulary and language sections for the non-LEP students.

TRAINING

The Training Component has as its objectives: (a) to improve the skills of the teachers in teaching content areas; (b) to increase administrator, teacher, and staff knowledge of the culture and heritage of the students in the project; (c) to increase teacher knowledge and skills in the use of the project material; and (d) to increase the skills of both teachers and staff members to train others interested in using the materials.

Teachers receive teacher training in specific methods and techniques to assist LEP students to develop and improve English language skills. Some of the areas of training for the teachers include background knowledge of

the CASETS materials, diagnostic and prescriptive skills, learning center concept, computer-based instruction and group approach, operational skills for computer equipment, interpretation of statistical data, cultural training, evaluation and linguistic training. Inservice training sessions are held once a month for the teaching staff. The area addressed each month is determined by what the teachers have indicated as an area of need in the needs assessment conducted at the beginning of the school year.

The CASETS staff receives more intensive training in the areas of evaluation, research, designing and programming instructional materials, statistical analysis, computer science and teacher training.

The training component is designed to insure that the teaching staff and the project staff develop and/or reinforce competencies related to their area of responsibility. Opportunities for inservice training and college training are offered to the project teachers and to the project staff.

ADDITIONAL CAPABILITIES

For the 1982-83 school year, CASETS is proposing to offer an authoring program to the teachers who are using the materials. This will allow them to input vocabulary which they need to develop, and let the students do drill and practice.

During the same year, CASETS is planning to test an alternative instructional approach for both social studies and ESL sessions. Either the learner or the teacher will be able to control branching capabilities through which each student will be able to go back to see the concepts and the questions. This will be available for the entire Social Studies lesson and for the questions in the case of ESL lessons.

In 1982-83, CASETS will continue to investigate cost-effective and time-effective solutions to provide auditory support in both English and Spanish.

In the case of the programs for life skills, the programs will provide a greater range of interaction with the students. In other words, the students will be able to respond to questions by typing words rather than a letter or number.

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Project C.A.S.E.T.S.
Computer-Assisted Spanish English Transition Sequence
A Title VII, ESA Program of the Dallas Independent School District

GLOSSARY

by Cheryl Lani H. de Juarez
English Language Development Specialist

ALGORITHM - A step-by-step procedure that lists instructions for solving a problem or accomplishing a task.

ALPHANUMERICS - Set of symbols (e.g., letters and/or numerals, and/or special punctuation, mathematical, or graphic symbols.

ANIMATION - Graphic display that conveys motion.

BASIC - Acronym for beginners all-purpose symbolic instruction code. High-level programming language that permits use of simple English words and common math symbols.

BIT - One binary digit; the smallest element of digital data.

BREAK - Interruption in program activity. Returns program to mode to accept operator commands.

BYTE - Basic unit of information in a computer (8 bits). One byte usually represents one character.

CAI - Acronym for computer assisted instruction; an interaction between a student controlled display and a response-entry device for the purpose of achieving educational outcomes.

CAL - Acronym for computer assisted learning.

CBI - Acronym for computer based instruction.

CHARACTER - An individual letter, numeral, or special character. In the computer, characters are made up of a number of bits; is synonomous with "BYTE".

CHIP - See MICROPROCESSOR.

CMI - Acronym for computer managed instruction.

COURSEWARE - Package of software and any supplementary printed material comprising a course of study.

CPU - Central processing unit - The "BRAIN" and/or "HEART" of the computer. It controls what the computer does using arithmetic, logic, and control elements.

CRT - Acronym for cathode ray tube; a television-like picture tube used to display images (TEXT). Sometimes referred to as a VDT, or monitor. NOTE: May be confused with the acronym for criterion-referenced tests.

CURSOR - Usually a small (hyphen-size) moveable indicator on the CRT that lets the user know where the next character to be typed will appear.

DATA FILES - A collection of related data records organized in a specific manner (e.g., students' scores by group).

DELAY - A brief (measured in seconds) pause in presentation of text.

DISKETTE - See FLOPPY DISK.

DISK DRIVE - Information storage device.

DISPLAY - Visual representation of data on the CRT.

DISPLAY RATE - Speed at which information is presented on the CRT.

DRILL AND PRACTICE - Computer supplements regular classroom instruction by reviewing concepts and providing questions and feedback after student response.

EDUCATIONAL GAMES - Student must demonstrate mastery of set and cognitive skills to "win".

ERASE - To remove or clear information from a storage medium (e.g., CRT, CPU).

EXPANSION INTERFACE - Hardware device that allows for additional memory (storage for data).

FLASHING - sudden and repeated display of symbols, characters, works, etc. Also referred to as "blinking".

FLOPPY DISK (DISKETTE) - A small flexible disk (looks like 45 RPM record) in which digital data is stored for later retrieval and use.

FORMAT - A contraction of "form of material", meaning the way in which text is displayed on a given screen.

FRAME - Any single display of information (text, graphics) on the CRT (similar to a frame of film).

GRAPHICS - Nonalphanumeric (symbolic) two-dimensional displays. Also set of characters used to create nonalphanumerical displays.

HARDCOPY - Data or information printed on paper.

HARDWARE - Equipment; can include CPU (keyboard), disk drives, cassette players, CRT, cables, printer.

HIGHLIGHT - Intensified light in character display.

I/O - Input/output.

INPUT - Information put into the computer through one of its peripherals.

INTERACTIVE - System/instructional program that provides 2-way, quick response communication with student/user.

INVERSE VIDEO - See REVERSE SCREEN.

JUSTIFICATION (LEFT/RIGHT) - Display format in which left and/or right margins are equal for each line.

KEYBOARD - Device for typing information into the computer.

K - Symbol for 1000. Shorthand notation for 1024 BITS, BYTES or words of digital data. A computer with 16K BYTES of memory has 16 X 1024 BYTES of memory.

LAYOUT - See FORMAT.

LINE FILTER - Hardware device used to connect several peripherals to one master switch. Regulates surges in current.

LINE PRINTER - Hardware device that prints hardcopy of data one line at a time.

MICROCOMPUTER - A complete computing system consisting of software and hardware. The CPU uses a microprocessor.

MICROPROCESSOR - Central unit of a microcomputer on a single chip of semi-conductor matter, that contains the logical elements to carry out commands.

OUTPUT - Information shown on a display unit (eg. CRT, printer).

PERIPHERALS - Supplementary equipment that puts data into, or accepts data from the computer (microprocessor).

PILOT - Command-oriented authoring language used to create CAI.

PROBLEM-SOLVING - Student learns about some aspect of the real world by using a computer program to solve a problem.

PROGRAM - A list of instructions the computer executes to perform a task.

PROGRAM FILES - Indicates programs included on any given floppy disk.

RAGGED RIGHT - Use of only left justification; used without the hyphenation found in left/right justification.

RESOLUTION - Degree to which fine detail can be presented on CRT.

REVERSE SCREEN - Change from printing light characters on a dark screen and/or vice versa.

SCROLLING - Vertical movement of text on CRT from bottom upward; movement is continuous until it reaches end of program, or a break is executed .

SIMULATION - Computer recreates a real-world environment for study.

SOFTWARE - Computer programs and data; includes applications programs, operating systems and computer languages.

SPACE - The area on the CRT not occupied by text/graphics.

TEXT - Information displayed in alphanumeric characters.

TUTORIAL - Computer provides new information as well as drill and practice to teach a set of materials.

VDT - Video display terminal. See CRT.

VIEWING FIELD - Portion of CRT available for display of information.

WINDOW - Independent segments of computer display (e.g., CRT could be divided in 2 parts to show text and pictures).